



Evergraphics PlusTM
(A Monochrome
Graphics Adapter)

OWNER'S MANUAL AND REFERENCE GUIDE

EV-231A

EV-231C

EV-231D

(VERSION 2.0)

EVER for EXcellence

Everex
Evergraphics Plus™
(A Monochrome Graphics Adapter)

OWNER'S MANUAL AND REFERENCE GUIDE

EV-231A

EV-231C

EV-231D

(VERSION 2.0)

**EVEREX SYSTEMS INC.
48431 MILMONT DRIVE
FREMONT, CA 94538**

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Warning

Class B: Computing Device

WARNING: This equipment generates and uses radio frequency energy and if not installed and used in strict accordance with the manufacturer's instructions, it may cause interference to radio and television reception. The product has been certified and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

1. Ensure that card mounting screws, attachment connector screws, and ground wires are tightly secured.
2. Reorient the computer with respect to the receiver.
3. Move the computer away from the receiver.
4. Plug the computer into a different outlet so that computer and receiver are on different branch circuits.
5. Reorient the receiving antenna.

This product requires the use of shielded interconnect cables and connectors for proper installation and connection to peripheral devices and to insure compliance with FCC Class B limits for radio frequency emissions. Shielded cables are available from authorized dealers. The manufacturer is not responsible for any radio or television interference caused by using other than the recommended cables or by unauthorized modifications to this equipment.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful: "How to Identify and Resolve Radio TV Interference Problems." This booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402, Stock No. 004-000-00345-4 (FCC, Part 15.838 b).

Check List

Your Evergraphics Plus carton should contain these items:

- Evergraphics Plus Monochrome Graphics Adapter (EV-231A, EV-231C, or EV-231D)
- Evergraphics Plus software diskette
- Plastic adapter support bracket
- Owner's Guide and Reference Manual
- Owner Registration and Warranty Card
- Foam padding and packaging materials.

NOTE 1: If any of these items are missing or damaged, please consult your place of purchase.

NOTE 2: Save all the Everex packaging materials that accompany the Evergraphics Plus. If you ever ship the Evergraphics Plus to Everex Systems for any reason without adequate packaging, your warranty may be affected. As with any major purchase you make, keep the sales invoice.

NOTE 3: Circuit boards are sensitive to static electricity, which can damage their delicate electronics. You can pick up static electricity simply by walking on a carpeted floor. Protect your board by grounding yourself. To ground yourself, touch the metal cover of your computer before you pick up a circuit board, then handle the board carefully by the edges.

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**DISCLAIMER: WHILE WE DO OUR BEST TO AVOID
SUCH A SITUATION, EVEREX SYSTEMS WILL NOT BE
RESPONSIBLE FOR ANY LOSS OF INFORMATION
RESULTING FROM THE USE OF THE PRODUCT.**

Section 1: Introduction

1.1 Features

The Evergraphics Plus is one of the most reliable and versatile Monochrome text and graphics adapters on the market! Just look at these features:

- Compatible with IBM text, Hercules monographics and Xenix Operating Systems.
- 80 column by 25 row alphanumeric display mode.
- Ability to extend alphanumeric display mode to 132 columns by 25 rows or 132 columns by 44 rows for use with popular software packages.
- Lets you switch display modes and display memory from software without having to reset the switches inside your computer.
- Standard parallel printer port that can be configured as LPT1, LPT2, LPT3 or disabled.
- 720 horizontal x 348 vertical pixel addressable graphics.

1.2 Quick Installation

1. Switch OFF and unplug all cables attached to the computer. **Make sure there is no power to your system!** Also turn off the power to any peripheral devices (such as printers) attached to your computer.

Introduction

2. Remove the cover of your computer.
3. Set the system switch (SW1) on the motherboard of your computer for monochrome display.
 - a. In an IBM PC or PC XT: SW1 is a dipswitch with eight positions behind the left drive bank. Positions 5 and 6 should be in the OFF position.
 - b. In an IBM AT: SW1 is a two-position slide switch behind the left drive bank. Push SW1 to the monochrome position (towards the back of the chassis).
4. Remove the expansion slot cover of an available expansion slot. Save the screw.
5. Insert the Evergraphics Plus adapter into the expansion slot. Secure the board by inserting the screw you removed in step 4.
6. Reinstall the cover.
7. Connect the 9-pin cable from the monitor to the mounting bracket of the Evergraphics Plus. If you are running a printer, connect the 25-pin cable from the printer to the mounting bracket of the Evergraphics Plus.
8. Boot up your system with DOS (either on a diskette or

from a hard disk drive). If you have an AT system, run the SETUP program on the Advanced Diagnostics diskette (or an equivalent program for compatibles) and indicate you have monochrome display.

Congratulations, the installation is complete!

Section 2: Graphics Adapter Configuration

There are three versions of the Evergraphics Plus Monochrome Graphics Adapter: EV-231A, EV-231C, EV-231D. These adapters have the same functions, features, and software. The major distinction between each card is the physical layout and the jumper settings necessary for configuration.

NOTE: To properly configure your adapter before installing it into your computer system, you must consider what version adapter you have and implement its specific jumper settings.

This section provides the physical layout with respective jumper locations and the Default Jumper Settings and Definitions for each version of the Evergraphics Plus. There is also a section on the parallel printer port which includes information on how to change the default settings when your system has another parallel port.

Helpful Hint For Setting Each Jumper: "Off" means remove the jumper plug from the pins. We recommend leaving the plug on 1 pin only when you want to take the jumper plug off. This will make the plugs easy to find when you want to reconnect the pins. Also, the jumper plugs have a hole at the top of them to make removing the jumper from pins easier. To remove or adjust the placement of the jumper plugs, bend a paper clip, insert the bent end into the hole and pull the jumper up. (See Figure 1).

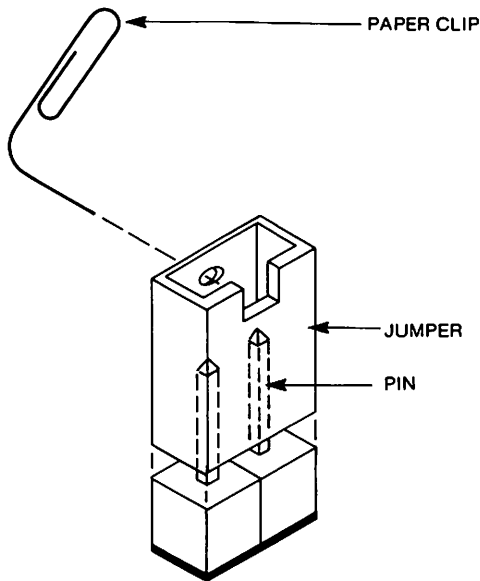


Figure 1: Removing the Jumper Plug

2.1 Configuring The EV-231A

Below is a diagram of your Evergraphics Plus EV-231A with all the jumper locations you need to know.

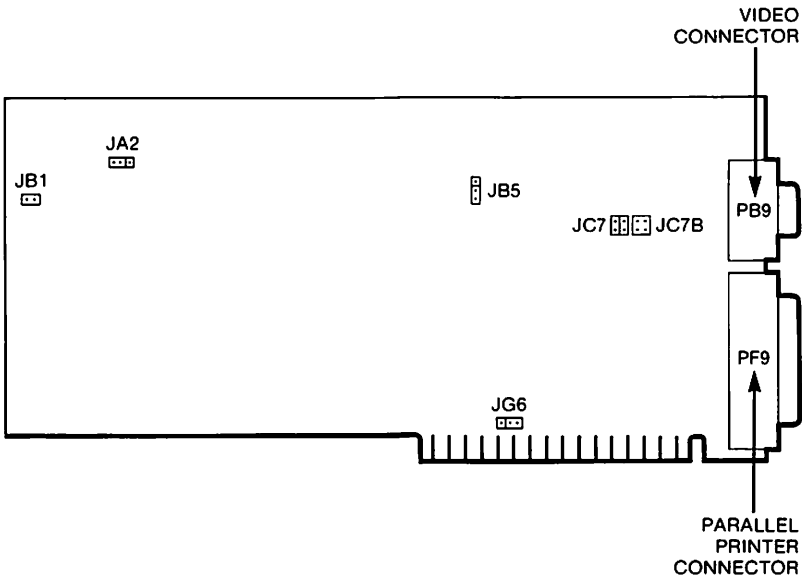


Figure 2: Jumper Locations For EV-231A

Graphics Adapter Configuration

TABLE 1
EV-231A
Jumper Settings

Jumper Location	Default Setting and Definition * Indicates Default Setting
JA2	This three-pin jumper enables or disables the Evergraphics Plus' ability to display 132 columns. The default setting enables 132 column display.  Enable 132 Col* Disable 132 Col
JB1	Factory use only. Leave the jumper on the two pins.  Factory Only*
JB5	Factory use only. There should be no jumper shunt connecting the two pins.  Factory Only*
JC7B	Factory use only. There should be no jumper shunts connecting the pins.  Factory Only*

Graphics Adapter Configuration

- JC7 The parallel printer port is set with an I/O port address from 3BC to 3BE (highest priority). This printer port address is the same as the one on IBM's Monochrome Display Adapter which is referred to as PRN or LPT1. You only need to change this configuration if there is another parallel port in your system. To avoid port address conflicts between the parallel devices, you can change the printer port address on the Evergraphics Plus to the second priority address 378-37F (LPT2), the third priority address 278-27F (LPT3) or you can disable the printer port entirely.



3BC-3BE*



378-37F



278-27F



Disabled

- JG6 Select IRQ setting for the parallel printer port. The default setting is IRQ7, which is used when the printer port address is 3BC-3BE and 378-37F. Change the IRQ setting to IRQ5 if the printer port address is 278-27F.



IRQ7*



IRQ5

- PB9 Video Connector. Attach the 9-pin cable from a monochrome monitor.

- PF9 Parallel Printer Port Connector. Attach the 25-pin cable from a printer to this connector.
-

2.2 Configuring The EV-231C

Below is a diagram of your Evergraphics Plus EV-231C with all the jumper locations you need to know.

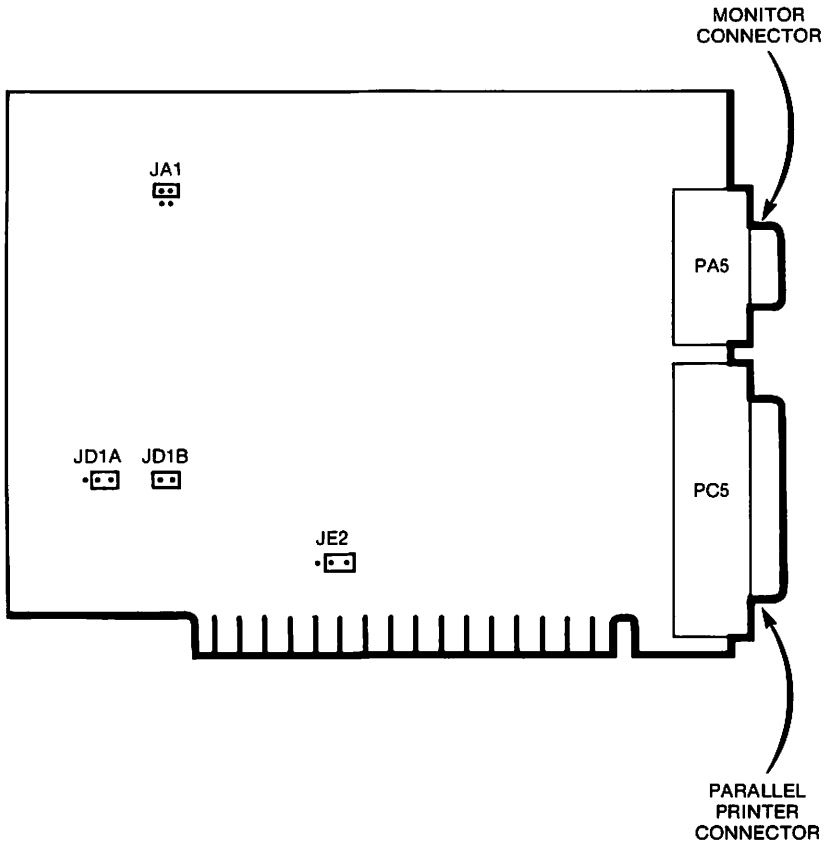


Figure 3: Jumper Locations For EV-231C

Graphics Adapter Configuration

TABLE 2
EV-231C
Jumper Settings

Jumper Location	Default Setting and Definition * Indicates Default Setting
JA1	The parallel printer port is set with an I/O port address from 3BC to 3BE (highest priority). This printer port address is the same as the one on IBM's Monochrome Display Adapter which is referred to as PRN or LPT1. You only need to change this configuration if there is another parallel port in your system. To avoid port address conflicts between the parallel devices, you can change the printer port address on the Evergraphics Plus to the second priority address 378-37F (LPT2), the third priority address 278-27F (LPT3) or you can disable the printer port entirely.  3BC-3BE*  378-37F  278-27F  Disabled
JD1A	This three-pin jumper enables or disables the Evergraphics Plus' ability to display 132 columns. The default setting enables 132 column display.  Enable 132 Col*  Disable 132 Col

Graphics Adapter Configuration

JD1B Factory use only. Leave the jumper on the two pins.



Factory Only*

JE2 Select IRQ setting for the parallel printer port. The default setting is IRQ7, which is used when the printer port address is 3BC-3BE and 378-37F. Change the IRQ setting to IRQ5 if the printer port address is 278-27F.



IRQ7*



IRQ5

PA5 Video Connector. Attach the 9-pin cable from a monochrome monitor.

PC5 Parallel Printer Port Connector. Attach the 25-pin cable from a printer to this connector.

2.3 Configuring The EV-231D

Below is a diagram of your Evergraphics Plus EV-231D with all the jumper locations you need to know.

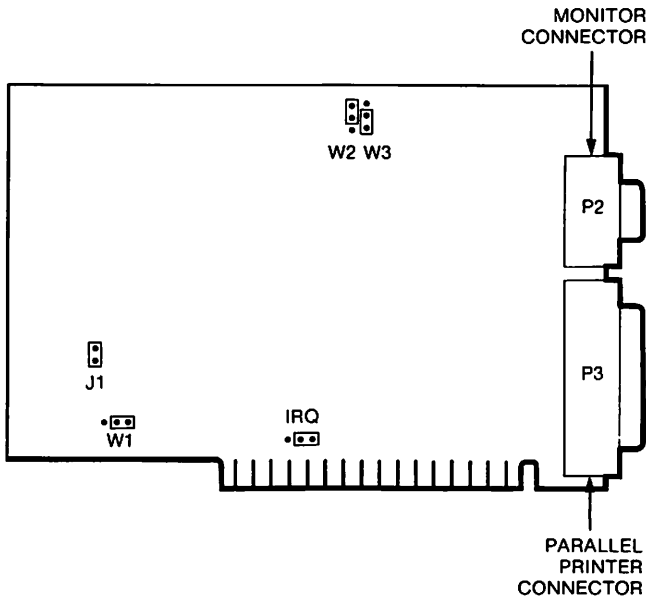


Figure 4: Jumper Locations For EV-231D

Graphics Adapter Configuration

TABLE 3
EV-231D
Jumper Settings

Jumper Location	Default Setting and Definition * Indicates Default Setting
W2, W3	The parallel printer port is set with an I/O port address from 3BC to 3BE (highest priority). This printer port address is the same as the one on IBM's Monochrome Display Adapter which is referred to as PRN or LPT1. You only need to change this configuration if there is another parallel port in your system. To avoid port address conflicts between the parallel devices, you can change the printer port address on the Evergraphics Plus to the second priority address 378-37F (LPT2), the third priority address 278-27F (LPT3) or you can disable the printer port entirely.  3BC-3BE*  278-27F  378-37F  Disabled
W1	This three-pin jumper enables or disables the Evergraphics Plus' ability to display 132 columns. The default setting enables 132 column display.  Enable 132 Col*  Disable 132 Col

Graphics Adapter Configuration

J1 Factory use only. Leave the jumper on the two pins.



Factory Only*

IRQ Select IRQ setting for the parallel printer port. The default setting is IRQ7, which is used when the printer port address is 3BC-3BE and 378-37F. Change the IRQ setting to IRQ5 if the printer port address is 278-27F.



IRQ7*



IRQ5

P2 Video Connector. Attach the 9-pin cable from a monochrome monitor.

P3 Parallel Printer Port Connector. Attach the 25-pin cable from a printer to this connector.

2.4 The Parallel Printer Port

There are two connectors on the mounting bracket of the Evergraphics Plus (See the physical layout of any version of the Evergraphics Plus Adapter). The smaller connector contains nine pins for the monitor. The larger 25-pin connector is for the standard IBM parallel printer. The printer port is configured with an I/O port address from 3BC to 3BE, which is the highest priority printer address often referred to as PRN or LPT1. The interrupt request line (IRQ) is set at IRQ7. The port address 3BC-3BE is the same one used by the IBM Monochrome Display Adapter. If you already have a printer port in your system configured with the same I/O port address you have several options.

1. You can reassign the port address to 378-37F (LPT2) or 278-27F (LPT3).
2. You can disable the Evergraphics Plus printer port.
3. You can disable the other printer port in your system.
4. You can change the printer port address on the other adapter if its hardware allows this.

For options 1 thru 3, specific jumper settings are provided in Tables 1-3. Refer to the table which corresponds to the adapter you are using:

EV-231A	Table 1
EV-231C	Table 2
EV-231D	Table 3

Section 3: Physical Installation

3.1 System Requirements

- IBM PC, XT, AT, or compatible computer
- One double-sided, double-density disk drive
- PC-DOS or MS-DOS operating system
- 64K bytes of internal computer memory
- An IBM TTL monochrome monitor or compatible monitor

NOTE FOR INSTALLATION INTO A SYSTEM WITH THE XENIX OPERATING SYSTEM:

The Evergraphics Plus is hardware compatible with the Xenix Operating System. Xenix requires special device driver software written for its operating system for all hardware installed in a computer running under Xenix. Therefore, information on EVGRAPH, Lotus, and all the other software mentioned in this manual is not applicable when the Evergraphics Plus is installed in a computer using the Xenix Operating System. After you install the Evergraphics Plus in these computers, proceed with normal operating procedures for Xenix.

NOTE: The Evergraphics Plus does not display 132x44 or 132x25 under the Xenix Operating System.

3.2 Hardware Installation

Before You Begin: Remove your monitor from the top of your computer and clear an area around your desk leaving plenty of room to work.

1. Turn OFF the computer's power. Face the back of the system unit, and disconnect the power cord. **Make sure there is no power to your system!** Also turn off the power to all peripheral devices attached to your computer (printers, external drives, etc.).
2. Remove the retaining screws that hold the cover on your system. Slide the cover forward. When it stops sliding, tilt the cover up and lift it away. Refer to the following figure.

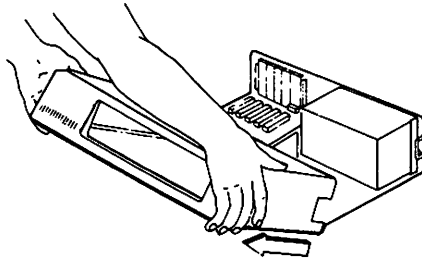


Figure 5: Removing The Cover

Physical Installation

3. If you've never looked inside your system before, you may be bewildered by all the cables and boards. Try not to disconnect anything, but push the cables gently to one side to see underneath them.
4. On the floor of the system, behind the left drive bank, is a dipswitch block known as SW1. Set the system switch SW1 for monochrome display. The proper setting of this switch is necessary for the correct installation of the Evergraphics Plus.
 - a. **In the IBM PC and XT:** SW1 is a rectangular block of eight slide or rocker switches on the system board behind the left drive bank. Set switches 5 and 6 to the OFF position. Do not disturb any of the other switches. Please see figure 6A.

NOTE: The IBM PC and some compatibles have a second dipswitch block called SW2 on the system board near SW1. Be careful not to confuse SW1 and SW2.

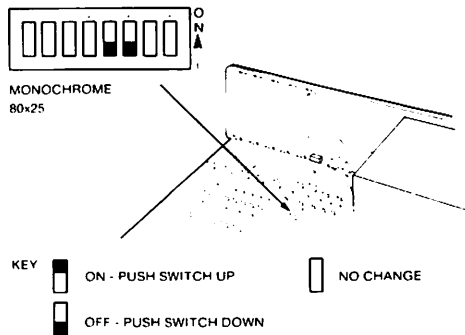


Figure 6A: SW1 in the IBM PC and PC XT

- b. **In the IBM AT:** SW1 is a two-position slide switch. Move it to the monochrome position (toward the back of the chassis). See Figure 6B.

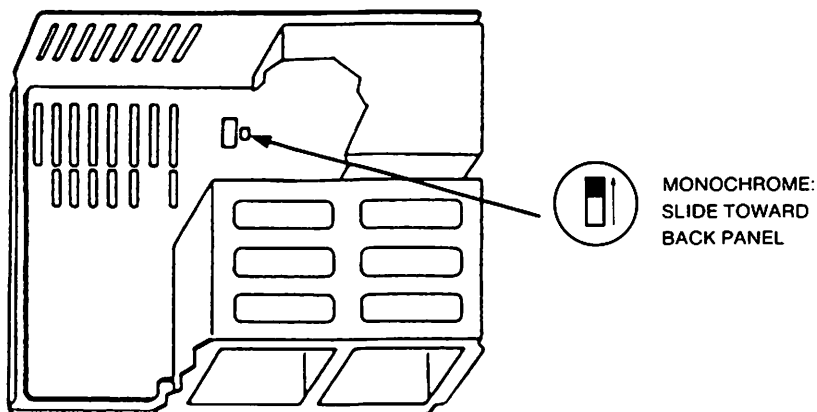


Figure 6B: SW1 in the IBM AT

5. Locate an available expansion slot and remove the screw that holds the slot cover in place. Then remove the expansion slot cover. See Figure 7.

NOTE: If there is a monochrome display adapter board already in your system, you will now have to remove it to install the Evergraphics Plus adapter.

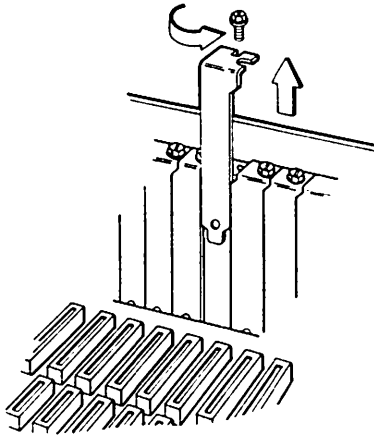


Figure 7: Removing the Expansion Slot Cover

6. Hold the Evergraphics Plus by the top edge and carefully push the board into the available slot. Make sure that the gold-plated connector fingers on the bottom of the board slide all the way into the slot. The mounting bracket should be aligned with the system's bracket. Refer to the following figure.

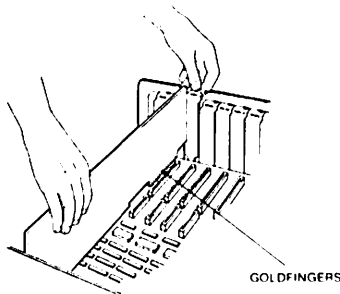


Figure 8: Installing the Evergraphics Plus

7. Insert the slot cover screw that you removed earlier, and tighten it to secure the Evergraphics Plus board into the unit.
8. Replace the computer's cover. You can slide the cover on without lifting the computer. Insert and tighten all the screws you removed from the computer's back panel.
9. Connect the cable from the monitor to the 9-pin connector located on the mounting bracket of the Evergraphics Plus adapter. If you are running a printer, connect the cable from the printer to the 25-pin connector located on the mounting bracket of the graphics adapter.
10. Reconnect the AC cord and any other cables which were disconnected earlier.
11. Boot-up the system with DOS (either on a diskette or from a hard disk drive).
12. If you have an IBM AT or compatible system, run the SETUP Program on the Advanced Diagnostics diskette (or an equivalent program for compatible systems) and indicate that you have monochrome display.
13. Congratulations! The physical installation of the Evergraphics Plus is finished. Proceed to the next section on "Software Installaton."

Section 4: Software Installation

A utility diskette with several helpful programs accompanies the Evergraphics Plus adapter. Verify that the utility diskette has the following files:

FILE.LST	List number of files and their names
EVGRAPH.EXE	All 4 of these EVGRAPH programs are needed to choose display mode, monitor type, display memory, and to modify the 132 columns device driver
EVGRAPH.ERR	
EVGRAPH.HLP	
EVGRAPH.MEN	
EBASIC.EXE	Modifies IBM's BASICA program to include the graphics mode
ETEST.EXE	Diagnostic program for Evergraphics Plus
CUBE.BAS	EBASIC demo program
LOADEVRX.BAT	132 col batch file for Lotus Ver 1A
13225.EXE	Execute Lotus 1A in 132 columns
13244.EXE	Execute Lotus 1A in 132 columns
EVX.INS	Installation program for 132 column drivers
EVXTD44.DRV	132 columns by 44 rows driver (For Lotus Ver 1A)
EVXTD25.DRV	132 columns by 25 rows driver (For Lotus Ver 1A)
EVXGD.DRV	Graphics driver
S80X25.COM	Change screen size to 80x25
LOTUS2 <DIR>	Sub-directory programs to create 132 columns drivers for Lotus 1-2-3 Versions 2.0 and 2.01

SYMPHONY <DIR> Sub-directory programs to create
132 columns drivers for Symphony
Versions 1.0, 1.1, and 1.2

4.1 EVGRAPH

EVGRAPH is a software utility program that is menu-driven, user-friendly, and context-sensitive. It enables you to choose the display mode, the screen memory, and the type of monitor connected to the Evergraphics Plus without having to set or change any switches inside your computer. EVGRAPH also modifies the 132 columns device drivers according to the type of monitor you indicate with this program.

The EVGRAPH program lets you inform the Evergraphics Plus board what kind of monitor is attached to it. EVGRAPH lists three different brand names of monitors; if your monochrome monitor is not in this list, try selecting all three separately and then choose the one which works best.

NOTE: If scrolling or garbage appears on the screen after exiting the EVGRAPH program back to DOS, try adjusting the horizontal and vertical sync knobs to find the optimal display.

EVGRAPH makes it easy to switch display size or screen memory after boot-up for use with all your monochrome software application programs. To use EVGRAPH, insert the Everex Systems diskette into floppy disk drive A and type:

A>EVGRAPH

[enter]

The cursor arrow keys on the numeric keypad move the cursor up and down within each window. The [F6] function key helps you switch from window to window in the EVGRAPH menu and the [F8] key selects your choices. Following is a summary of the function keys and their operation:

TABLE 2
Summary of EVGRAPH Function Keys

FUNCTION KEY	OPERATION
[F1]	Toggles ON and OFF the help menu. The [F1] function key will display the help text window that corresponds to the line that is highlighted by the cursor.
[F6]	Changes the active window.
[F8]	Executes your choices. Be certain that all your selections on the EVGRAPH menu are correct before you press [F8].
[F9]	Updates 132 columns device driver. This operation will modify the Symphony and Lotus device drivers required to run these programs in 132 columns. The device drivers are modified according to the type of monitor you indicate is connected to the Evergraphics. We suggest making a copy of the Evergraphics Plus diskette before you modify the Lotus and Symphony device drivers! If you modify the device drivers on the original diskette, the modifications are permanent.
[F10]	Exits from the EVGRAPH program back to DOS.

When the EVGRAPH menu is on your screen, choose the display mode (80 columns or 132 columns), the screen memory (4K, 32K, or 64K), and indicate which type of monitor is connected to the Evergraphics Plus. After you have made your selections, press the [F8] function key to execute your choices.

NOTE: To operate in Hercules Graphics Mode and the Extended Text Mode of 132x44 or 132x25, set the screen memory size to 32K screen memory or more.

4.1.1 Creating An AUTOEXEC.BAT File

It is very useful to have the EVGRAPH software in a path in the autoexec.bat file in the root directory of your boot disk; when EVGRAPH is in a path in the autoexec.bat file, you can change display modes and screen memory from any directory or subdirectory that you are working in. The following instructions provide information on creating an autoexec.bat file.

1. Boot-up your computer with DOS. These instructions assume your boot disk is hard disk drive C. If your computer's configuration is different, please change references to drive C to your designated boot disk (for example, you might power up your computer from floppy disk drive A).
2. Insert the Everex utility diskette into floppy disk drive A.

3. Create a subdirectory on your boot disk called \EVGRAPH, and then copy the EVGRAPH files from the utility diskette into the \EVGRAPH subdirectory. To do this, make sure the DOS prompt > is on the screen then type:

```
c:                                [enter]
cd\                              [enter]
md \evgraph                      [enter]
copy a:*. * c:\evgraph          [enter]
```

4. Confirm that you are in the root directory of your system disk. At the prompt > type:

```
cd\                              [enter]
type autoexec.bat               [enter]
```

If the message "File not found" appears, go on to Step 5.

If one or more command lines appear, get a pencil and paper and copy down the lines exactly as they appear on your screen.

5. **WARNING:** This step will overwrite any existing autoexec.bat file in the root directory of your system disk. The path name indicated below is an example; you can place any directory or subdirectory in the path name. At the DOS prompt > type:

```
copy con autoexec.bat           [enter]
path = c:\; c:\dos; c:\evgraph  [enter]
```

If you wrote down the contents of a previous `autoexec.bat` file in Step 4, type the command lines back in now, exactly as they appeared. After you have entered everything you want in your `autoexec.bat` file press:

[F6] **[enter]**

Pressing the [F6] function key and the [ENTER] key will save the `autoexec.bat` file.

6. The DOS message "1 File(s) copied" will confirm that a new `autoexec.bat` file has been created.

4.1.2 Optional Command Line Arguments

The display modes that the Evergraphics Plus can operate in are given a display number. The EVGRAPH menu lists the numbers and their corresponding display mode. When you are familiar with the numbers given to each display mode, you can change the display mode with a command line argument. For example, if you use display mode 2 frequently (132x44 Text Mode), you can change the display with a command line argument. For example, if EVGRAPH is on your hard disk, you could issue a command line argument by typing at the DOS prompt >:

EVGRAPH 2 **[enter]**

The monitor will then display text in the extended display mode of 132 columns by 44 rows.

There are other command line arguments available with EVGRAPH as well. Aside from the display mode, you can also indicate the amount of screen memory and the type of monitor connected to the Evergraphics Plus with a command line argument. The format of the command line is as follows:

EVGRAPH <mode> <-s##> <-mAAA> [enter]

Where the < > symbols indicate an optional parameter:

- | | |
|-------|--|
| mode | selects the display mode. Possible values are 0, 1, or 2 with each value corresponding to a specific display mode. 0 displays 80x25, 1 selects 132x25, and 2 picks 132x44. |
| -s## | selects the amount of screen memory. Possible values are -s4, -s32, and -s64. |
| -mAAA | chooses which type of monitor is connected to the Evergraphics Plus. Possible values are -mIBM, -mPGS, or -mTAT. |

For example, when you type in the command line:

EVGRAPH 2 -s64 -mTAT [enter]

you will change the display mode to 132x44 text display mode, the screen memory to 64K, and the monitor type to a Tatung monochrome monitor.

Default Values of the Command Line:

If you omit the <mode> parameter, the EVGRAPH menu will appear on the screen. The default screen memory <-s##> is 32K, and the default monitor <-mAAA> is IBM.

4.2 Creating A Work Diskette to Run Lotus and Symphony in 132 Columns Display

We recommend creating a *Work Diskette* before you choose the EVGRAPH [F9] function to modify the 132 columns device drivers. If you modify the original Everex Systems diskette, the modifications will be permanent. The following instructions will create a *Work Diskette* which you can subsequently use to add device drivers into the Lotus and Symphony device driver library to run 132 columns.

NOTE: This procedure requires a blank formatted diskette, and the Everex Systems utility diskette.

1. Boot up your computer from DOS, either on a hard disk or from a floppy diskette. At the DOS prompt > type:

```
diskcopy a: b:          [enter]
```

2. DOS will prompt you for the SOURCE diskette; the Everex utility diskette is the source diskette and the blank, formatted diskette is the TARGET diskette. Insert the Everex Systems diskette (the source diskette)

-

EVGRAPH [enter]

-

6. Hit the [F10] function key to exit EVGRAPH back to DOS.

NOTE: USE THE WORK DISKETTE YOU JUST CREATED TO ADD THE 132 COLUMNS DEVICE DRIVERS INTO THE LOTUS AND SYMPHONY DRIVER LIBRARIES.

Instructions on loading the 132 columns device drivers are in "Section 4: Application Software in 132 Columns" in this manual.

4.3 Running IBM Diagnostics

Before you run IBM DIAGNOSTICS, set the display memory size to 4K with the Evergraphics Plus EVGRAPH software. Otherwise, you will see blurring images. If you did not set the display memory to 4K and the blurring images occur, turn the power to your computer OFF, and then turn it on again to return to normal display. Re-boot the system with DOS, and set the display memory to 4K at the A> prompt.

NOTE: To successfully run all IBM monochrome adapter compatible software, use the Evergraphics Plus diskette to set the display memory to 4K bytes before proceeding.

4.4 Running Hercules Compatible Mode

The Evergraphics Plus adapter is fully compatible with the Hercules Graphics Card. To run Hercules compatible

software, use the Evergraphics Plus EVGRAPH software to set the display memory size at 32K. You can then proceed with normal operating procedures to run software configured for Hercules mode.

4.5 EBASIC

EBASIC enables you to use all of BASICA's graphics commands with the Evergraphics Plus card.

NOTE: You must have a true IBM computer with IBM BASIC ROMS on the motherboard to use the EBASIC programming specifications.

Running EBASIC

1. Insert the Evergraphics Plus utility diskette in drive A, and a DOS diskette with the BASICA.COM file in drive B.
2. Copy the EBASIC.EXE file onto the DOS diskette that contains the file BASICA.COM.

A>copy ebasic.exe b: [enter]

3. To run EBASIC, type:

A>b: [enter]
B>ebasic [enter]

4. On the screen will appear the BASIC copyright statement and the "OK" prompt.
- After you enter EBASIC, it will go through the following sequence of steps:
- load BASICA.COM from the default drive
- change some of the graphics routines in BASICA
- set the screen mode to SCREEN 2
- enter the modified BASICA.

Since EBASIC runs in high-resolution mode (SCREEN 2), you cannot use SCREEN 0 or SCREEN 1 statements, which are low-resolution modes.

Load and run CUBE.BAS while you are in EBASIC to make sure that EBASIC is operating properly.

4.6 EBASIC Programming Specifications

The following specifications will be useful in writing your own EBASIC programs. You should be familiar with BASIC before attempting EBASIC commands.

- EBASIC cannot acknowledge the following statements:

COLOR
SCREEN 0
SCREEN 1
WIDTH 40

Therefore, perform the following procedures to edit BASIC programs written for IBM color cards:

1. Substitute SCREEN 0 and SCREEN 1 statements with SCREEN 2
 2. Eliminate the COLOR statements
 3. Substitute the WIDTH 40 statement with WIDTH 80
 4. To offset the larger monochrome screen, change the x,y coordinates
 5. Change the aspect ratios to 2:3
- The monochrome display has an aspect ratio of 2:3. To get a round circle, embed the aspect ratio in a circle

statement. To draw a square, make the vertical lines two-thirds as long as the horizontal lines.

- EBASIC characters are 9 pixels wide by 14 pixels tall, while BASICA characters are 8 pixels wide by 8 pixels tall. Remember this when converting screen positions from rows and columns to x and y coordinates.
- Screen coordinates are 0-719 horizontal, and 0-347 vertical. Refer to the following figure.

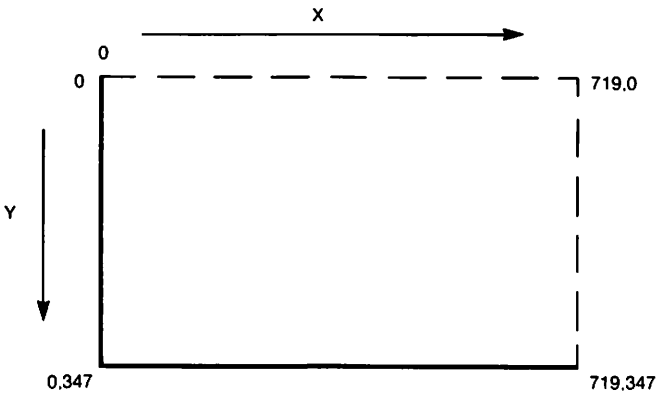


Figure 9: Screen Coordinates

Section 5: Application Software in 132 Columns

The Evergraphics Plus is accompanied by instructions and software for operating several popular software application programs in 132 columns. Software drivers are included for Lotus 1-2-3 Versions 1A and 2, as well as all versions of Symphony. Wordstar will also run in 132 columns, however, Wordstar is modified with the DOS DEBUG program. It's necessary to refer only to the sub-section that is applicable to the version of software that you operate.

NOTE: Rather than using the original Everex Systems diskette to modify your software to display 132 columns, use the Work Diskette created in this manual in Section 4.2 "Creating A Work Diskette to Run Lotus and Symphony in 132 Columns Display."

5.1 General Information

Lotus and Symphony provide instructions for preparing the programs to use a display adapter. These instructions are given in the Lotus 1-2-3 and Symphony manuals. Follow the installation instructions in your software manual to select the desired display mode. The Evergraphics Plus is "Hercules compatible", meaning that the Evergraphics Plus works with Lotus and Symphony just like the Hercules Graphics Card. In addition, the Evergraphics Plus also runs in 132 column spreadsheets.

The instructions for preparing your software for the Evergraphics Plus display adapter are usually found in the User Manual's "Getting Started" section under "Installing

Drivers." You have a choice of many display adapter options:

1. If you want to operate Lotus in the high resolution monochrome mode (this setting will provide high resolution text AND graphics), then follow the steps given in installing Lotus for the HERCULES option.
2. If you have either a color or monochrome display adapter installed in your computer along with the Evergraphics Plus and you want to operate both of them with Lotus, then follow the steps given in installing Lotus for the BOTH option.

The Evergraphics Plus adapter can display Lotus and Symphony spreadsheets in 132 columns, however, the application programs require special drivers. To extend the display mode with these drivers, Everex Systems has provided set-up programs on the utility diskette. These programs will automatically set-up Lotus and Symphony to operate in 132 columns. To run Lotus, Symphony or Wordstar in 132 columns, refer to the instructions specific to the type and version of software you operate.

NOTE: Your computer will have a fuzzy display if you warm boot (CTRL-ALT-DEL) when it is displaying 132 columns. Be sure to return to 80 columns before warm booting. If the fuzzy display occurs, turn the power to your computer off and turn it on again to return to normal display.

5.2.1 Running Lotus 1-2-3 Via Floppy Drives

Remember to use the Work Diskette you created from the original Everex Systems utility diskette. For more information on the Work Diskette, refer to Section 4.2 "Creating A Work Diskette to Run Lotus and Symphony in 132 Columns Display."

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4. Type: **LOADEVRX B:** [enter]
5. Follow the instructions as they are displayed on your screen (make sure the Everex diskette is in the A drive).
6. Type: **B:** [enter]
7. Type: **EVEREX A:** [enter]
8. Follow the instructions for floppy diskette installation as they are displayed on your screen. The 132 columns device driver splits the information on the screen in half. Follow the instructions on the side of the screen that pertains to your configuration (for example, the information on Installing the Everex drivers for a two floppy system are on the left side of the screen).

The floppy diskette installation instructions will require you to remove the Evergraphics Plus Utility Diskette from Drive A, and insert (in order) the LOTUS 1-2-3 System Diskette (a *backup* copy), the PRINTGRAPH diskette, the TUTORIAL diskette, and finally the 1-2-3 System Diskette (*backup*) in Drive A.

9. To run Lotus 1-2-3 in 132 columns, make sure that the patched Lotus System Diskette created in Step 7 is in floppy disk drive A. To display 132 columns:

Type: **A:** [enter]

Type: **13225** **[enter]**
 To display 132 columns x 25 rows
 OR
Type: **13244** **[enter]**
 To display 132 columns x 44 rows

Remember that the *backup* Lotus 1-2-3 System Disk must be inserted into drive A to run either 13225 or 13244.

10. The screen display must be in the 80 column mode to run LOTUS 1-2-3 in 80 columns, or any of the other 1-2-3 programs (TUTOR, GRAPH, etc). If necessary, use the EVGRAPH program on the Evergraphics Utility Diskette to set this display mode.

5.2.2 Running Lotus 1-2-3 Via a Hard Disk

It is assumed that you have at least one floppy disk drive "A" and one hard disk drive "C." If your Lotus system files are not stored on the C drive, please change all references to drive C to the drive letter where your Lotus files are.

Remember to use the Work Diskette you created from the original Everex Systems utility diskette. For more information on the Work Diskette, refer to Section 4.2 "Creating A Work Diskette to Run Lotus and Symphony in 132 Columns Display."

1. Install Lotus 1-2-3 onto the hard disk as "Hercules" mode and verify that the program works before proceeding to add drivers for 132 column display.

Application Software in 132 Columns

2. Insert the Evergraphics Plus software diskette into drive A.

3. Type: A: [enter]

4. Type: LOADEVRX C: [enter]

C: is the drive and directory where your Lotus system files are stored.

5. Make sure the Everex Work Diskette is in floppy disk drive A. Follow the instructions as they are displayed on your screen. The directions for installing the drivers on a hard disk are on the right half of the screen.

6. The set up procedure is now complete. Before displaying Lotus in 132 columns, make sure your screen memory is set for 64K. To run Lotus 1-2-3 in the 132 column mode, re-insert the Lotus System disk in drive A and type at the C> prompt:

13225 [enter] (for 132 columns x 25 rows)

OR

13244 [enter] (for 132 columns x 44 rows)

NOTE: If necessary, adjust the horizontal and vertical sync knobs on your monitor to find the optimal display.

If you wish to run 1-2-3 in the 80 column display mode or run any of the other 1-2-3 programs (e.g. TUTOR, GRAPH,

etc), the display must be in the 80 column monochrome display mode (you can access this display mode with the EVGRAPH software).

5.3 Lotus 1-2-3 Version 2.0 and 2.01, and Symphony Version 1.0, 1.1, and 1.2

The instructions in this section of the manual will enable you to run LOTUS 1-2-3 versions 2.0 and 2.01, and SYMPHONY versions 1.0, 1.1, and 1.2 in the 132 column display mode. The instructions in this section refer only to Lotus 1-2-3, but they apply equally to all versions of Symphony as well.

The INSTALL program enables you to create "driver sets" which contain the appropriate software to control the Evergraphics Plus adapter and other peripheral hardware of your computer. To include these drivers for 132 columns display mode, the drivers on the Evergraphics Plus Utility Diskette must be added to the driver library of LOTUS 1-2-3 and SYMPHONY. Therefore, use the Work Diskette you created in Section 4.2 "Creating A Work Diskette to Run Lotus and Symphony in 132 Columns Display."

5.3.1 Running Lotus 1-2-3 Version 2.0 and All Versions of Symphony Via Floppy Drives

If you are operating Lotus or Symphony from a hard disk, please skip to the next section.

NOTE 1: If you are using any version of Symphony, the following procedures will add the 132 columns driver into the Symphony driver library. Remember to change references to Lotus 1-2-3 to Symphony.

NOTE 2: Remember to use the Work Diskette you created from the original Everex Systems utility diskette. For more information on the Work Diskette, refer to Section 4.2 "Creating A Work Diskette to Run Lotus and Symphony in 132 Columns Display."

1. Insert the Lotus 1-2-3 Utility diskette in Drive A, and a blank formatted diskette in Drive B. The blank diskette will be your *backup* utility diskette.
2. Create a backup copy of the LOTUS 1-2-3 Utility Diskette as described in the LOTUS 1-2-3 manual. Select and copy only those files that are needed. If you copy the entire utility diskette, there will not be enough disk space to install the Everex drivers (which require at least 28K bytes of disk space).

To copy only those files that are needed to the backup disk, at the A> prompt type:

copy <file name> b: [enter]

3. Remove the LOTUS 1-2-3 Utility and the backup utility from the drives. Insert the Work Diskette created from the Evergraphics Plus Utility into Drive A, and another blank formatted diskette into Drive B.

4. Type in the following command at the A> prompt:

COPY \LOTUS2*. * B:

Call the disk in Drive B the "Driver Install Work Disk;" it should now contain the following files:

EVX2TD25.DRV	text driver for 132x25 display
EVX2TD44.DRV	text driver for 132x44 display
EVX2GD.DRV	graph display driver
132.BAT	batch file to run 1-2-3

And ALL of the Lotus 1-2-3 Files.

NOTE: The 132.BAT file contains the EVGRAPH command to automatically restore your computer system from 132 columns back to 80 columns upon exit. We recommend using the 132.BAT command to run 1-2-3 in 132 columns, and the 123 command to run 1-2-3 in 80 columns.

5. Remove both disks from their drives, and put the Evergraphics Plus Work Diskette away.
6. Insert the LOTUS 1-2-3 backup utility disk in Drive A.

Make sure the program 123.SET is resident on the Lotus 1-2-3 System disk before you carry out this step. If 123.SET is not on your 1-2-3 system disk, use the DOS COPY command and copy it onto the System disk from the "View to Lotus" disk.

7. Type:

INSTALL

[ENTER]

You will be prompted to replace the 1-2-3 utility disk with the 1-2-3 Install Library disk and the System disk.

8. From the Install Main Menu, select "Advanced Options."
9. From the Advanced Options screen, select "Add New Drivers to Library."

If the "Add New Drivers to Library" option has been completed successfully once, you will not need to perform this step again since all the new drivers for the Evergraphics Plus have been added to the Lotus Install Library. To create another driver set, go to step 11 to modify the existing driver set.

10. Insert the "Driver Install Work Disk" you created into Drive A and follow the instructions as displayed on the screen.

When this step is completed, the Everex drivers have been added to the Install library and a new driver set that uses these drivers can be created from 123.SET.

11. From the Install Advanced Options menu, now select "Modify Current Driver Set."

12. The Install program will show the different kinds of drivers it can contain and at the same time specify what drivers are currently in use or selected. To choose a text display driver that will enable you to display 132 columns, select "Text Display."
13. The Install program will prompt you for the driver you wish to use. Select "The Everex Edge 132x25 Toggle Mode" or "The Everex Edge 132x44 Toggle Mode" depending on which mode you wish to use.
14. To choose a graph display driver from the "Modify Current Driver Set" menu (Step 12), select Graph Display. When it displays the available graph display drivers, select "The Everex Edge 720x348 Toggle Mode."
15. Select "Return to Menu" to get back to the Advanced Options menu.
16. Save the driver selections you have made. The instructions here detail the steps required to create a separate driver set for each display mode.

NOTE: You just need to type 25 or 44; Lotus supplies the extension .SET.

EXAMPLES: To set a 132 column x 25 row display, create a separate driver set called 25.SET.

You will return to the DOS A> prompt. If not, select the default drive as A by typing "A:" followed with [ENTER].

20. Insert the 1-2-3 System disk in drive A and the Driver Set disk in drive B.
21. At the A> prompt type:

```
COPY 123.SET B:           [ENTER]
DEL 123.SET               [ENTER]
```

You are copying the default driver set 123.SET from your 1-2-3 System disk to your Driver Set disk and deleting it from the System disk to make room for additional files on your 1-2-3 System Disk.

22. Remove the Driver Set disk in drive B, and re-insert the Everex Driver Work Disk in drive B.
23. Copy the following programs onto your 1-2-3 System disk by typing in the following commands at the A> prompt:

```
COPY B:132.BAT           [ENTER]
COPY B:S80X25.COM        [ENTER]
```

24. You may also copy COMMAND.COM from the PC DOS disk to your 1-2-3 System disk; there should still be enough room on it. You are now finished with the

installation of 132 column drivers. To run 1-2-3 in different modes, put the 1-2-3 System disk in drive A and the Driver Set disk in drive B, and enter the following commands:

A>132 B:\25	for 132 x 25 display mode
A>132 B:\44	for 132 x 44 display mode
A>123 B:\123	for 80 x 25 display mode.

NOTE: The 132 column drivers cannot be used with A View of Lotus 1-2-3, PrintGraph or Access. If you must use these programs, you can only use them in the 80 column by 25 row display mode.

5.3.2 Running Lotus 1-2-3 Version 2.0 and 2.01 and All Versions of Symphony in 132 Columns on a Hard Disk

Before starting the install procedure, you must copy **ALL** the 1-2-3 files into a sub-directory known as \123 of your hard disk. (If necessary, refer to the LOTUS 1-2-3 manual on how to create backup copies of 1-2-3 onto a hard disk.) The following instructions assume that you have copied the 1-2-3 files into a sub-directory \123 of your hard disk C. If not, make sure to do this first, and then confirm that your hardware is set up with Drive C as your hard disk.

NOTE 1: If you are using any version of Symphony, the following procedures will add the 132 columns driver into the Symphony driver library. Remember to change references to Lotus 1-2-3 to Symphony.

NOTE 2: Remember to use the Work Diskette you created from the original Everex Systems utility diskette. For more information on the Work Diskette, refer to Section 4.2 "Creating A Work Diskette to Run Lotus and Symphony in 132 Columns Display."

1. Insert the Evergraphics Plus Work Diskette into drive A.
2. Make sure the C> prompt is on the screen, and type in the following commands:

NOTE: If you are installing the drivers for Symphony rather than Lotus, type "copy a: \symphony*. *" rather than "copy a:\Lotus2*. *".

CD C:\123

COPY A:\LOTUS2*. *

Sub-directory \123 in drive C should now contain:

EVX2TD25.DRV	text driver for 132x25 display
EVX2TD44.DRV	text driver for 132x44 display
EVX2GD.DRV	graph display driver
132.BAT	batch file to run 1-2-3
And ALL of the Lotus 1-2-3 Files.	

NOTE: The 132.BAT file contains the Everex S80X25 command to automatically restore your computer system from 132 column mode back to the 80 column mode upon exit. Subsequently, we

-

Follow the Install instructions, pressing [ENTER] until Install says that it has added the new drivers and that they may be selected. Press [ENTER] once more to get

to the Advanced Options screen.

When this step is completed, the Everex drivers have been added to the Install library and a new driver can be created from 123.SET.

8. From the Install Advanced Options menu, now select "Modify Current Driver Set."
9. The Install program will now show the different kinds of drivers it can contain and at the same time specify what drivers are currently in use or selected. It will also prompt you to select the driver type you want to change. To choose a text display driver for displaying 132 columns, select "Text Display."
10. Install will now list the text display drivers in its standard Install library and any new ones that have been added. It will prompt you for the driver you wish to use. Select "The Everex Edge 132x25 Toggle Mode" or "The Everex Edge 132x44 Toggle Mode" depending on which mode you wish to use.
11. To choose a graph display driver from the "Modify Current Driver Set" menu (refer to step 9), select "Graph Display." When it displays the list of the available graph display drivers, select "The Everex Edge 720x348 Toggle Mode."
12. Select "Return to Menu" next to get back to the Advanced Options Menu.

13. Save the driver selections you have made. The instructions here detail the steps required to create a separate driver set for each display mode.

NOTE: You just need to type 25 or 44; Lotus supplies the extension .SET.

EXAMPLES: To set a 132 column x 25 row display, create a separate driver set called 25.SET.

To set a 132 column x 44 row display, create a separate driver set called 44.SET.

123.SET is reserved for the 80 column x 25 row mode.

14. To create a separate driver set for each display mode, select "Save Changes" to save your selections. Install will display the default driver set name, 123, and prompt you to enter a different name if you wish.

Enter a new driver set name. For Example:

25 **[enter]**

Your selections are now saved to a new driver set, 25.SET, to be used with 132 column by 25 row display mode. (Similarly, enter 44 if you want to create a separate driver set for 132 columns and 44 rows). This driver set is stored in the same sub-directory \123 in your drive C as the 1-2-3 files.

15. After Install has completed saving the selected drivers on your hard disk, it will prompt you to press [F9] to return to the Main Menu or [ENTER] to exit. From the Main Menu choose "Exit Install Program" and "Yes" to return to DOS.
16. Congratulations! You have completed the installation of 132 column drivers. To run Lotus 1-2-3 or Symphony in different modes, put the 1-2-3 System disk in drive A and enter the following command(s) at the C> prompt:

132 25	[enter]	for 132 x 25 display mode
132 44	[enter]	for 132 x 44 display mode
123	[enter]	for 80 x 25 display mode

Those who wish to run Symphony in 132 columns would type:

Symphony 25	[enter]	for 132 x 25 display mode
Symphony 44	[enter]	for 132 x 44 display mode
Symphony	[enter]	for 80 x 25 display mode

NOTE 1: If necessary, adjust the vertical and horizontal sync knobs on your monitor to find the optimal display.

NOTE 2: The 132 column drivers cannot be used with A View of 1-2-3, PrintGraph, or Access. You can only use these programs in an 80 column by 25 row mode.

5.4 Wordstar

To use the Extended Display Mode with Wordstar, you must modify Wordstar with the DOS program DEBUG. The following procedures explain how to use debug.

It is assumed that you have two floppy disk drives and that these drives are designated as "A" and "B." If your system's logical drives have different designations, change the references to these designations in the following instructions to match the configuration of your computer system. For example, if you are running Wordstar from a hard disk drive, replace references to drive A with drive C, and references to drive B with drive A.

1. Insert the Wordstar program diskette into disk drive A and your Evergraphics Plus utility diskette into drive B.
2. Create a batch file called WSWIDE.BAT. The EVGRAPH command requires an argument to indicate the extended display mode you want. For a display mode of 132 columns by 25 rows enter "EVGRAPH 1 -S32"; for a display mode of 132 columns by 44 rows enter "EVGRAPH 2 -S32". The second EVGRAPH 0 command line listed on the next page will enable you to change your display mode back to 80 columns by 25 rows. At the A> prompt type:

copy con:wswide.bat [enter]
evgraph <1 or 2> -s32 <-mAAA> [enter]
WS132 [enter]
evgraph 0 <-s32> <-mAAA> [enter]
[F6] [enter]

The batch file has now been created. For more information on the command line arguments that appear in the < > above, refer to "Section 3.1.2 Optional Command Line Arguments."

3. You now need to create a working file. Type:

copy ws.com ws132.com [enter]

4. Remove the Evergraphics Plus utility diskette from drive B, and insert an IBM PC DOS diskette that has the DEBUG.COM file on it.

To find out if your PC DOS diskette (2.1 or higher) has a DEBUG.COM file, type:

DIR B:

5. Make sure the A> prompt symbol appears on the screen, then type:

b:debug ws132.com [enter]

Application Software in 132 Columns

6. The screen display is defaulted at 25 rows. Proceed to Step 9 if you want the display to remain at 25 rows. To increase the display mode to 44 rows, go on to Step 7.
7. The DEBUG prompt symbol "-" will now appear on your display, type:

-E248

[enter]

8. A series of numbers will appear on the display. The last two numbers, with a dot at the end will probably be "18." This "18" is the hexadecimal value for a 24 row screen.

For a 44 row display, you must change this value to represent 44. To do this, type:

2B

[enter]

NOTE: To change back to a 25 row display, replace 2B with 18.

9. The DEBUG prompt "-" will again appear on the display, type:

-E249

[enter]

10. A series of numbers will be displayed on the screen. The last two numbers with a dot at the end will be "50." This "50" value represents an 80 column screen.

You must change this value to represent a 132 column screen, type:

84

[enter]

11. The DEBUG prompt symbol will now appear on your display, type:

W

[enter]

The computer will now replace the current screen values with the new values that you just entered.

12. The DEBUG prompt symbol will now appear on the display. To exit the DEBUG mode, type:

Q

[enter]

You will now be able to use Wordstar in either a 132 column by 44 row or 25 row display mode depending on the values you have specified.

Section 6: Questions & Answers

Q: Why don't I get 44 rows when I increase the display mode using the EVGRAPH program on the Evergraphics Plus utility diskette?

A: *The IBM ROM BIOS limits the screen display to 25 rows of characters. An IBM BIOS software patch is required to enable the screen to display 44 rows of characters. Everex has developed software patches for the more popular software programs: WORDSTAR, LOTUS 1-2-3, and SYMPHONY. To enable the Evergraphics Plus to work with these software programs, refer to the sections on these programs for specific procedures.*

Q: When I run the IBM DIAGNOSTIC program on a PC/XT, I get blurring images and a high pitch from the monitor. After pressing CTRL-ALT-DEL, the screen menu indicates that I have a color card and a monochrome card in my system, although I have only one monochrome card. Why is this?

A: *The IBM PC allocates 32K bytes of display memory to a monochrome adapter, and another 32K bytes of display memory to a color adapter. If your Evergraphics Plus is set to 32K or 64K bytes of display memory, IBM DIAGNOSTICS thinks you have both a monochrome and color adapter in your system. To solve this problem, set your display memory to 4K bytes before running IBM DIAGNOSTICS.*

Q: Why does the screen blank out when I try to display Lotus graphics?

A: *Make sure that you have set the Evergraphics Plus for 64K bytes of display memory. To display monochrome graphics, you must have 64K bytes of display memory selected. This setting will not allow you to have any other display adapters installed in your computer. Also check to make sure that Lotus has been set for the HERCULES option.*

Q: Why can't I operate my standard Lotus in the 132 column Extended Display Mode?

A: *The standard Lotus 1-2-3 is not set up for the expanded 132 column mode. The screen size is set in an 80 column by 25 row display format. There are, however, software modifications which are available on the Evergraphics Plus utility diskette that will modify Lotus to use the Extended Display Mode. These modifications are explained in this manual.*

Appendix: Technical Specifications

A.1 Hardware Specifications

1. 6845 CRT Controller.
2. 64K bytes of display memory, which can be configured as 4K bytes, 32K bytes or 64K bytes in order to be compatible with IBM's Monochrome Adapter and with Hercules' Monochrome Graphics Adapter.
3. Standard parallel printer port that can be configured as LPT1, LPT2, LPT3 or disabled.
4. Compatible with Lotus 1-2-3, Symphony, HBASIC, and Xenix Operating System.
5. 720 x 348 monochrome graphics.
6. Normal alphanumeric display mode of 80 columns x 25 rows or extended display modes of 132 columns x 25 rows and 132 columns x 44 rows.

A.2 Display Memory Addressing

The display buffer address for monochrome applications is B0000 to BFFFF.

In the 80x25 alphanumeric mode, the display memory is organized as two pages of 4K bytes each. Page 0 runs from B0000 to B0FFF, while page one runs from B8000 to B8FFF.

In the graphics mode and in 132 column extended display, page 0 runs from B0000 to B7FFF, while page one runs from B8000 to BFFFF.

A.3 Graphics Operation

Graphics memory defines the screen to be 720 pixels horizontal by 348 pixels vertical. The address of the byte containing the pixel at (v,h) in the display memory, in Hex format is:

$$B0000H + (p * 8000H) + (h \text{ mod } 4) * 2000H + (5AH * y) + x$$

where p = page number
 v = vertical column (0 <= v <= 719)
 x = integer (v/8)
 h = horizontal row (0 <= h <= 347)
 y = integer (h/4)
 H = indicates Hex number

A.4 Alphanumeric Operation

The Evergraphics Plus is fully compatible with IBM's monochrome/printer adapter. In addition, it provides two pages of display buffer. Display pages start from B0000 to B0FFF for page one, and from B8000 to B8FFF for page two when the display memory is set at 64K bytes. Each page has 80 columns by 25 rows of characters. Each character consists of two bytes of memory; the even byte stores one of the 256 character codes, while the odd byte controls the attribute of the corresponding character code.

The following is the table for attribute code representation:

bit	7	6	5	4	3	2	1	0	Attribute
	B	0	0	0	I	0	0	0	Blank
	B	0	0	0	I	0	0	1	Underline
	B	0	0	0	I	1	1	1	Normal Video
	B	1	1	1	I	0	0	0	Reverse

while I= 0, normal foreground intensity
I= 1, high foreground intensity
B= 0, normal background intensity
blinking when blink enabled
(Register 3B8 – Bit 5)
B= 1, high background intensity
blinking when blink enabled

A.5 I/O Port Addresses

Port Addresses

3B4	6845 index register
3B5	6845 data register
3B8	mode register
3BA	status register
3BC	printer data register (read/write)
3BD	extended mode register (write only)
3BD	printer status register (read only)
3BE	printer control register
3BF	memory size register

Mode Register (3B8-write only)

bit 7:	page select; 0 for page 0, 1 for page 1
bit 6:	reserved
bit 5:	+ blink enabled
bit 4:	reserved
bit 3:	+ video enabled
bit 2:	reserved
bit 1:	graphic mode enabled
bit 0:	reserved

Status Register (3BA-read only)

bit 7:	-vertical sync
bit 6:	reserved
bit 5:	reserved (Board ID 1)
bit 4:	reserved (Board ID 0)
bit 3:	video output
bit 0:	+horizontal sync

Extended Mode Register (3BD-write only)

bit 7:	reserved
bit 6:	reserved
bit 5:	reserved
bit 4:	reserved
bit 3:	reserved
bit 2:	1 enables 132 column mode 0 disables 132 column mode
bit 1:	reserved
bit 0:	reserved

Printer Status Register (3BD-read only)

bit 7:	-BUSY, 0 when printer busy
bit 6:	-ACK; when set, printer is ready to accept another transfer
bit 5:	+PE, paper end
bit 4:	+select status
bit 3:	-error
bit 2:	reserved
bit 1:	reserved
bit 0:	reserved

Printer Control Register (3BE-read/write)

bit 7: reserved
bit 6: reserved
bit 5: reserved
bit 4: +IRQ7 enabled
bit 3: +select printer
bit 2: -INIT; 0 for printer reset
bit 1: +set auto line feed
bit 0: +STROBE, 0 for printer read

Memory Size Register (3BF-write only)

	64K	32K	4K
bit 1	1	0	0
bit 0	1	1	0

bit 2 - bit 7: reserved

A.6 Register Settings

TABLE 3
CRT Control Register Settings
Monochrome Mode

Register Number	Register Type	80x25	132x25	132x44	Graphics 720x348
R0	Horiz. Total	61	9A	9A	35
R1	Horiz. Display	50	84	84	2D
R2	Horiz.Sync Pos	52	86	86	2E
R3	Horiz.SyncWdth	0F	0F	0F	07
R4	Vert. Total	19	19	2D	5B
R5	Vert.TTL Adjust	06	06	02	02
R6	Vert. Display	19	19	2C	57
R7	Vert.Sync Pos	19	19	2C	57
R8	Interlace Mode	02	02	02	02
R9	Max.Scan Line	0D	0D	07	03
R10	Cursor Start	0B	06	06	00
R11	Cursor End	0C	07	07	00
R12	Start Addr H	00	00	00	00
R13	Start Addr L	00	00	00	00
R14	Cursor Addr H	00	00	00	00
R15	Cursor Addr L	00	00	00	00

TABLE 4
Mode and Extended Mode Register Settings
(Hexidecimal Values)

	Mode Register	Extended Mode Register	Memory Size Register
	3B8	3BD	3BF
80x25 Text	28	00	00 or 01 or 03*
132x25 Text	28	04	01 or 03*
132x44 Text	28	04	01 or 03*
720x348 Graphics	0A	00	03*

- * 00: 4K screen memory
 01: 32K screen memory
 03: 64K screen memory

A.7 Connector Specifications

TABLE 5
Printer Adapter Connector Specifications

Signal Name	Adapter Pin Number
-Strobe	1
+Data Bit 0	2
+Data Bit 1	3
+Data Bit 2	4
+Data Bit 3	5
+Data Bit 4	6
+Data Bit 5	7
+Data Bit 6	8
+Data Bit 7	9
-Acknowledge	10
+Busy	11
+P.End (out of paper)	12
+Select	13
-Auto Feed	14
-Error	15
-Initialize Printer	16
-Select Input	17
Ground	18-25

Refer to Figure 10

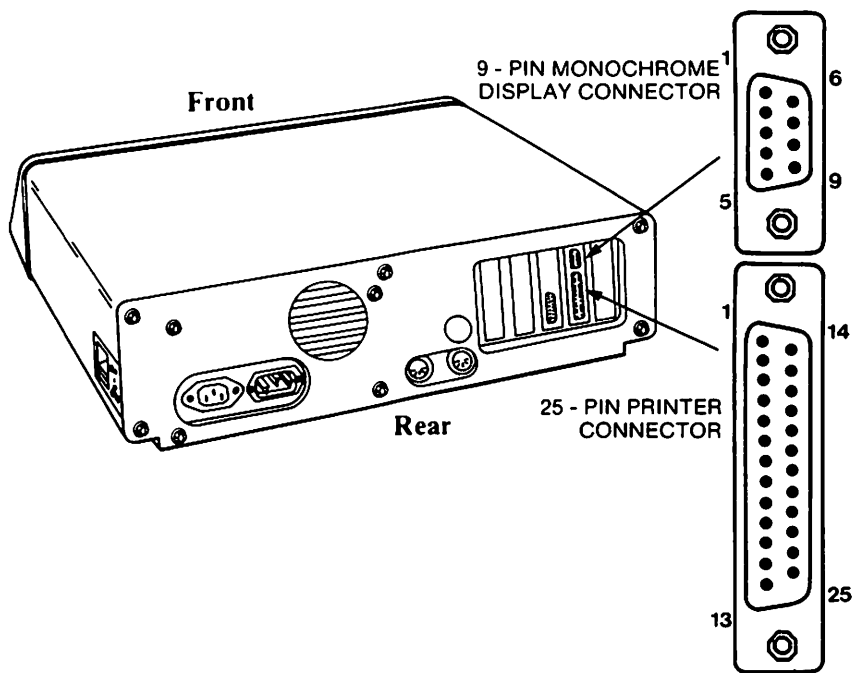


Figure 10: Connector Locations

TABLE 6
Monochrome Display Adapter Connector Specifications

Signal Name	Pin Number
Ground	1
Ground	2
Unused	3
Unused	4
Unused	5
+Intensity	6
+Video	7
+Horizontal	8
-Vertical	9

NOTE: Signal voltages are 0.0 to 0.6 Vdc at down level and 2.4 to 3.5 Vdc at high level.

Refer to Figure 10

Warning

EV-657, EV-657-1, EV231A, and EV231C

The printer port circuitry on these graphics adapters is formed by a single CMOS gate array chip which is extremely sensitive to static electricity. To avoid damaging your printer port gate array, please pay special attention to the following suggestions:

1. NEVER connect your printer cable to the printer port when your printer and/or computer's power is ON.
2. Once the printer cable is connected to the printer port, always turn the computer ON before you turn the printer ON.
3. Avoid touching the pins on the printer port with your fingers.

It is always good practice to treat your circuit boards by these rules.

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